

# PIAAC results

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## PIAAC results: need for new approaches in improving adult literacy

Issue 1/2014

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Research



Paula Gouw

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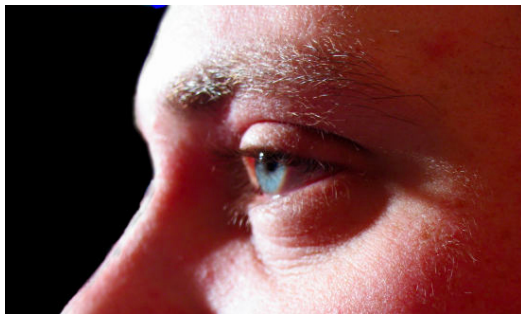
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Technological innovations, such as eye tracking might help diagnose literacy problems.

Photo: Morguefile

### Abstract

According to the results of the PIAAC study, too many adults are not able to acquire basic reading skills. This influences their individual lives, besides their economic and social well-being, negatively (OECD, 2013). In accordance with current research results and trends, adult literacy seems to gain less attention than is required. To prevent the problem of poor reading skills among adults, the approach to adult literacy has to be changed. A more diverse approach, which includes the role of emotions in the learning process and the practical implication of new technologies, might provide a valuable contribution to detect literacy skills among adults and design a suitable learning environment for improving their reading skills.

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### Background



Maurice de Greef

Prof. Dr. Maurice de Greef is a professor investigating learning effects of low skilled and illiterate learners at the Vrije Universiteit Brussel and realized a PhD in educational science with a special focus on the outcome of adult education in terms of social inclusion. He's a project-manager, researcher and trainer in local, regional and European projects in innovating learning environments, strategic policy-making in adult education and developing

According to the results of the PIAAC study (Programme for the International Assessment of Adult Competencies) a significant number of North-Western countries in Europe have a population with insufficient or inadequate reading skills (Organisation for Economic Co-operation and Development [OECD], 2013). Furthermore, of the 24 countries participating in PIAAC, between 4.9% and 27.7% of adults only meet the lowest standard of literacy proficiency (below reading proficiency level 2) (OECD, 2013).

Literacy is defined by the OECD (2013, p. 59) as

*"the ability to understand, evaluate, use and engage with written texts to participate in society, to achieve one's goals, and to develop one's knowledge and potential".*

People with poor reading skills might experience a range of problems due to the fact that lower literacy proficiency is associated with lower levels of social and economic well-being, labour participation, hourly wages and health (OECD, 2013). Besides the individual consequences, it seems obvious that a lack of reading proficiency results in less productivity on the labour market, less (income) tax revenues and higher costs for care and social insurances. Although it might be reasonable to view such effects with caution, for example in the Netherlands, lack of sufficient reading skills costs approximately 556 million Euros a year (De Greef, Segers, & Nijhuis, 2013).

In comparison with other countries, in the Netherlands, the percentage of adults who struggles with reading is relatively low. Only the reading skills of citizens in Finland and Japan are better than those of the Dutch population (OECD, 2013). At first glance, it appears that the Netherlands is 'doing well'. However, despite the fact that the Netherlands is highly ranked compared to other countries, the number of adults with reading problems is still increasing. Nowadays 11.9% of the Dutch population (representing 1.3 million adults between 15 and 65) belongs to the group 'struggling readers' instead of 9.4% of 17 years ago (Buisman, Allen, Fouarge, Houtkoop, & Van der Velden, 2013). Moreover, the gap between poor and excellent readers is still growing. To date, the main question is how to reduce the number of struggling adult readers? More concretely, this article will focus on the role of emotions and new technologies in reading performance of struggling adult readers.

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## The benefits of investment in literacy

Investment to increase the literacy rate, especially at the lowest levels, could be successful. The Dutch example shows a possible return of investment of 700 million Euros (Kok & Scholte, 2013). Involvement in (non-)formal learning environments has already proven to increase the literacy rate directly. Apart from that, positive side effects concerning social and economic variables have been found as well. For example, adult participants of language, numeracy, digital and basic skills courses will experience personal growth, more self-confidence and 40% - 60% will experience better social inclusion (Purcell-Gates, Degener, Jacobson, & Soler, 2000; De Greef, 2012a; De Greef, 2012b). Social inclusion can be defined as: "a multidimensional process of individuals who try to control and to cope with resources and services, take part in society and its activities, connect to social relations and feel included in the (local) area" (De Greef, Verté, & Segers, 2012, p. 455).

Most adults develop a broader range of employee skills next to more confidence and satisfaction in their job and 60% perform better on the labour market after participation in a literacy course (Tett et al. 2006; Department of Labour, New Zealand, 2010). Furthermore, adults with higher literacy skills participate more often in education (Houtkoop et al., 2012), and, based on results in Dutch regions, 40% of the participants of language, numeracy, digital and basic skills courses joined other additional courses after joining a first one (De Greef, 2012c). There is evidence to conclude that investment in literacy programmes seems to generate a range of economic and social benefits, which includes more than increasing literacy rates.

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## Attention for adult literacy

In line with the PIAAC results and the individual and social impacts of a lack of reading proficiency, one would expect the discussion concerning improvement of adult literacy to receive more attention in diverse research projects. However, this seems not to be the case. In a literature review of the Association of Literacy Educators and Researchers (ALER) and the Literacy Research Organisation (LRA), Morrison et al. (2011) found that only 0.4% of all articles in ALER publications and 2.2% in LRA publications addressed the issue of adult literacy. Taken into account that not all of the work in research projects can be reflected by the number of publications in scientific journals, research interest in adult literacy still seems to be rather low.

Attention in society can be seen as an indicator of interest in adult literacy as well. To provide a good indicator is an interesting challenge. Thinking about 'society', the first question arises: 'What is included in 'society'? Does it include media, policy, culture, education programmes, employers, employees, or maybe more (or less)? The second question is how to measure

strategies for approaching (vulnerable) learners.



Saskia Brand-Gruwel

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Halszka Jarodzka

Dr. Halszka Jarodzka is an assistant professor at the Welten Institute, Research Centre for Learning, Teaching and Technology. Her expertise lies in the use of eye tracking to understand and improve learning and instruction. In that, she investigates characteristics and training of visual expertise in professional domains, instructional design of computer-based learning and testing environments, as well as perceptual processing of texts and pictures.

attention, for example in policy. Is it reflected by investment in adult literacy education, governmental research funding, questions about this topic in parliament or raising stakeholders' awareness by media campaigns? Furthermore, is a supplementary investment in education to prevent children and adolescents from literacy problems part of investment in adult literacy or not? As it is difficult to represent attention in society by one indicator, it might be preferable to use another way to indicate the interest in this topic.

The "What's Hot, What's Not" annual survey identifies trends in the field of literacy (more concretely in media, policy, culture, instruction materials and education programmes) based on interviews with 25 literacy leaders of the English-speaking countries (Cassidy & Cassidy, 2004). Although the "What's Hot, What's Not" survey is not a scientific based questionnaire, it provides an interesting insight into the ideas about adult literacy in society. Due to the fact that the experts do not qualify adult literacy as a 'trendy' topic, it was included in 2010 for the last time and has since disappeared from the list (Cassidy, Valadez, & Garret, 2010). Notably, at least 75% of the experts, however, stated adult literacy as a theme which should receive more attention. Taking into consideration that countries have a variety of reasons to focus on other important issues, it is clear that in research practice and society as well, adult literacy seems to gain less attention than required.

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## One approach does not fit all

While some studies have found compelling evidence of the effectiveness of various instructional approaches and reading strategies on reading outcomes for children and adolescents, recent research concerning adult readers with low literacy skills shows only small effects (Hock & Mellard, 2011; Sabatini, Shore, Holtzman, & Scarborough, 2011; Greenberg, et al. 2011). Hock and Mellard (2011) stated that transferring an intervention from one population (adolescents with low literacy skills) to another (adults with low literacy skills), and from one setting (secondary schools) to another (adult education programmes) is complex. In addition the 'group' struggling adult readers can be characterized by a scale of characteristics. For example in research on student profiles among 237 students Kurvers, Dalderop and Stockmann (2013) found that students were born in 44 different countries with ages varying between 20 and 70 years old. Of them, 63% had a job, 52% were native language learners, 33% had a background in special education (most of them were native language learners), 2% were diagnosed with dyslexia and teachers expected a further 10% might be diagnosed with dyslexia as well. All teachers used a variety of instructional approaches and teaching materials. Noteworthy was the fact that self-developed materials by teachers are widely used.

Based on the variety of this target-group one can well assume that an effective teaching approach that applies to children and adolescents cannot be directly translated to adult readers with low literacy skills. Furthermore, with respect to the individual characteristics of struggling adult readers, they deserve a learning approach which meets their specific needs and backgrounds.

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## Linguistic and cognitive factors in reading acquisition

Learning to read is complex and difficult. First of all cognitive and linguistic factors are one of the most important elements in reading acquisition (Verhoeven, Reitsma, & Siegel, 2011). Many processes, such as word recognition processes (sight word and phonic decoding processes) and language comprehension processes (spoken vocabulary, semantic and syntactic processes), are important in becoming a skilled reader (Stuart, Stainthorp & Snowling, 2008). In the simple view of reading, comprehension can be seen as the product of word decoding and listening comprehension (Hoover & Gough, 1990). Various models describe the reading process. Due to space limitations, reading models are not discussed in depth here. In general these models can be characterized as 1) bottom-up models, which describe lower order reading processes (word recognition), 2) top-down models, which describe higher order reading processes (comprehension of the text) and 3) interactive models, which are a combination of bottom-up and top-down models (e.g. Rayner, Pollatsek, Ashby, & Clifton, 2012; Verhoeven, Reitsma, & Siegel, 2011). Rayner et al. (2012) stated that the model of the reading process can best be described as a bottom-up model in which the reader received some help from top-down processes.

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## Emotions in adult literacy

Besides cognitive and linguistic factors discussed above, teachers in adult basic education

have recognised the importance of other factors as well. From a neuroscientific perspective, in addition to the cognitive domain, the affective domain plays an important role in learning processes (Jalongo & Hirsch, 2010). Palmén (2013) states that learning is a holistic process, which includes both emotional and intellectual aspects. Emotions, which are defined as "multidimensional constructs comprising affective, psychological, cognitive, expressive, and motivational components" play a crucial role in learning processes (Frenzel & Stephens, 2013, p. 5).

Reading anxiety, for example, can comprise uneasy feelings (affective), worries about what could happen if someone makes mistakes (cognitive), impulses to avoid particular situations (motivational) and somatic reactions such as sweating (physiological).

In the control-value theory, emotions are viewed as sets of interrelated psychological processes influencing learning performance (Pekrun, et al. 2011). Central are achievement emotions which are defined as "emotions tied directly to achievement activities or achievement outcomes" (Pekrun, 2006, p. 317). In this theory one's subjective control over learning- and performance related activities and outcomes is crucial (Frenzel & Stephens, 2013). Furthermore, these activities and outcomes are valued by the learner (pleasant or unpleasant activities and success or failure). Pekrun (2006) includes past emotions, as well as current and prospective emotions. Negative past achievement emotions, such as shame and negative prospective emotions, such as anxiety and hopelessness, might inhibit struggling adult readers from reading or starting a 'second learning-to-read life'.

In Pekrun's control-value theory, emotions also contain a motivational component, which could influence behaviour (Frenzel & Stephens, 2013). Motivation, defined by Dresel and Hall (2013, p. 59) as 'processes underlying the initiation control, maintenance, and evaluation of goal-oriented behaviors', exists of two components 1) personal evaluation of desirability and 2) expectancy for success. The latter includes self-efficacy, which is a key component in social cognitive theory and is the belief in your own capabilities to learn something specific, for example reading (Bandura, 1993). The level of self-efficacy influences the level of understanding texts, which subsequently plays a crucial role in reading performance (Solheim, 2011). In addition, a significant negative correlation between reading self-efficacy, reading anxiety and reading performance has been found (e.g., Ghonsooly & Elahi, 2011; Putman, 2010).

Motivation has a positive effect on learning processes and helps students to develop more effective learning strategies (Nevgi, 2001). Pavonetti, Brimmer, and Cipielewski (2002) found that motivation is positively correlated with time spent on reading, which then subsequently impacts one's comprehension of text (Guthrie, Wigfield, Metsala, & Cox, 1999). In particular for struggling adult readers motivation is crucial. In contrast to children and adolescents, adults do not have a compulsory attendance at school. In other words, if adults are not motivated to read and experience or have experienced negative emotions, they can avoid every reading and learning activity.

Emotions could play an important role in the learning-to-read process, thus, there is a critical need for an instrument which measures reading related emotions of adults. Pekrun, et al. (2011) developed the Achievement Emotions Questionnaire (AEQ) which measures learning related emotions in classroom and is based on the control-value theory. In many countries adult literacy programmes include formal as well as informal learning settings. A challenge for the future is to develop an instrument which measures the reading related emotions of struggling adult readers and which can be used in different learning settings. Further research is necessary to obtain an holistic picture of the role of emotions on reading performance.

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## New technologies used for improving literacy

Besides further research, new technologies could be valuable in answering the question: how to reduce the number of struggling readers? The first step is to diagnose the lack of reading skills. According to De Greef, Van Deursen, and Tubbing (2013) a valuable tool to determine if one has significantly low reading or writing skills is the DIS-scale (Diagnostic Illiteracy Scale). This 'quick scan' provides a short questionnaire of eleven statements and tries to diagnose the risk of reading problems among adults. Given that the DIS-scale is also available as an App on an I-phone, it can be used in many places. For example, the employer can use this instrument to reveal the employees' need for support in reading the safety regulations. The DIS-scale will not represent the rate of illiteracy or specific reading problems. Therefore, a more extensive way of measurement will be necessary, which will investigate reading problems more in detail, to support instruction interventions.

One of the probably most innovative tools to investigate the rate of literacy and specific reading problems is an eye tracker, which is an apparatus to capture what a person looks at on a screen, for how long, and in which order (Holmqvist et al., 2011). Eye movements are a good measure of the reading comprehension process (Rayner, Chace, Slattery & Ashby, 2006). In comparison to skilled readers, struggling readers need more and longer fixations (the time that eyes come to a rest and information is processed) and more regressions (go back in text to reread the words: Rayner, et al., 2012). In addition, eye tracking might be even used to

increase reading performance by observing and reflecting on the reading process in more detail. For example the use of rereading as a reading strategy or pictures in the text which give information about the context and support the comprehension of the text can be investigated in detail by an eye tracker. Though it might be sufficient for new demands of our modern 'technology-based society', the question is if it can be used in a proper way for adults with low reading skills and whether it is possible to use this innovative method to detect and analyze reading problems and prevent ongoing adult literacy.

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## Conclusion

At present, too many adults still fail to acquire basic literacy skills, which has a negative impact on their individual lives as well as their economic and social well-being. To increase these literacy skills, it is important to identify different factors influencing the learning process of struggling readers. The control-value theory which gives a central role to emotions might provide a framework to allow for a more in-depth investigation into the role of emotions. Therefore, a reading emotion questionnaire for struggling adult readers, including questions about motivation and self-efficacy, should be developed to gain more insight into reading related emotions which could influence reading performance. New technologies, such as mobile testing using an 'app' and eye tracking, might provide a valuable contribution to detect and improve literacy skills among adults and design a suitable learning environment. Although this technology seems to be useful in detecting struggling readers and reading problems, there is a critical need for further research in the domain of adult literacy. According to professionals and researchers in the field of adult education, the broader scope of literacy can be confirmed by the fact that a wide range of factors can influence reading performance.

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